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Irrigation Management of Flax

Traditionally, flax was regarded in Western Canada as a 'special' crop — rather difficult to grow and inclined to be hard on the land. More often than not, it was only grown if conditions or prices happened to be favorable or if something had occurred to prevent the planting of one of the major cereals. With the disappearance of many of the objections to flax, it now enjoys a much higher standing among farm crops and it is being grown with more assurance and success than formerly.

Contrary to popular belief, flax seedlings, under favorable conditions, can withstand freezing about as well as small grains. Flax, 50 to 75 mm (2 to 3 in.) in height has survived temperatures of -8°C without injury. Once established, the crop thrives in cool weather and gets a head start on weeds. Thus early planting usually permits flax to complete most of its development in favorable weather before the heat of July and August. Once established, flax is moderately sensitive to soil salinity (5 to 10 dS/m).

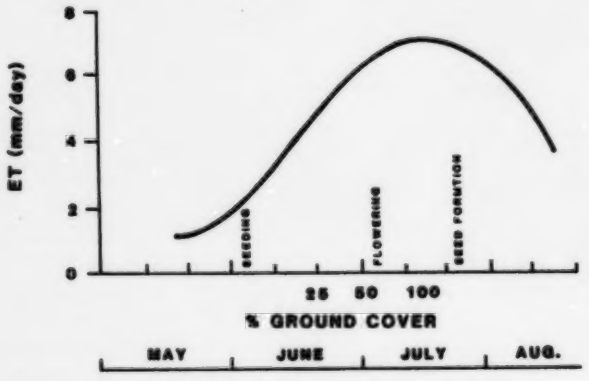


Figure 1. Crop water use of flax during the growing season.

Crop Water Requirements and Crop Yields

Flax grows well on any soils suitable for cereal production, especially those soils that are moderately fine textured. In non-restricting soils flax develops a short branched taproot, encompassing a rooting zone of 1.0 m (3.3 ft). The seeding date for flax is generally around the first week in May. If weeds are allowed to grow, then cultivated under, an earlier maturing variety is recommended when seeding later in May. The growth period is from May 15 to August 25, allowing about 100 days for maturity.

Over the growth season, crop water use may be as high as 410 mm (16 in.). Over a 30-day period, water use will approach 6.5 mm/day (0.26 in./day). During the seedling stage, water use will range from 1 to 3 mm/day (0.04 to 0.12 in./day), rising to a high of 7.0 mm/day (0.28 in./day) during the flowering stage (See Figure 1). The critical water requirement period for flax is from flowering to just prior to seed ripening. Adequate soil moisture must be maintained (above 50 per cent allowable depletion) in order to maximize yield and oil content. Root development is nearly completed by the flowering stage. Flax removes approximately 70 per cent of its water requirements from the top half of the root zone (50 cm).

Comments

Due to its small seed size and shallow seeding requirement, flax requires good soil moisture conditions near the surface in order for proper germination to occur. If soil moisture conditions are poor at the time of harvest, fall irrigation may be required to refill the root zone for the following crop year. When no fall irrigation takes place, it may then be necessary to irrigate after seeding in order for the crop to germinate. This irrigation should be limited to a light application of water (25 mm or less) to reduce the potential for soil crusting or cooling of the surface soil to the point where germination is delayed.

The major effect of irrigation on flax is to promote a second or third flushing of flowers and to maintain adequate moisture for plant growth until all flowers have developed seeds. By maintaining adequate soil moisture through this time period, a positive relationship exists between water use and yield (See Figure 2).

The last irrigation of flax should be completed by the second week in August to ensure that the seeds ripen. Extending the last irrigation past this time will encourage the crop to continue to grow, increasing the potential for frost damage and a delayed harvest.

Copies of this and related publications may be obtained from the Print Media Branch, Alberta Agriculture, 7000 - 113 Street, Edmonton T6H 5T6 or Alberta Agriculture's District Offices.

Irrigation Management Information

For further information regarding irrigation management of flax, contact your nearest Irrigation Branch office. These offices are located at: Lethbridge, 381-5136; Vauxhall, 654-2161; Airdrie, 948-8511; Taber, 223-7908; Strathmore, 934-3356; Brooks, 362-1212; Bow Island, 545-2231; Medicine Hat, 529-3616. North of Calgary, contact the Airdrie office or your local district agriculturist for assistance.

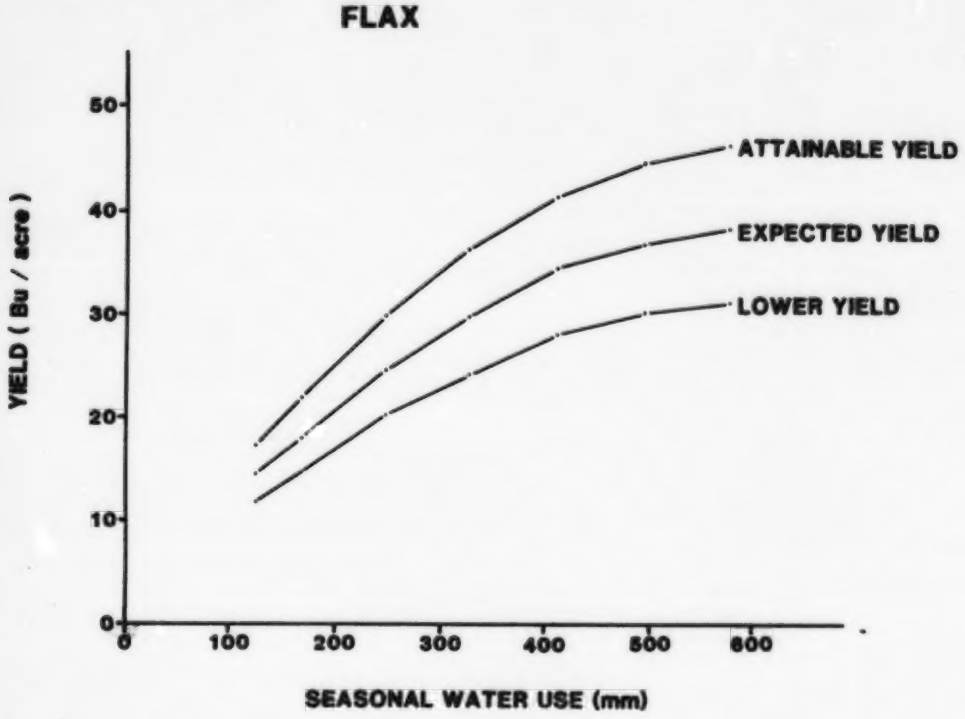
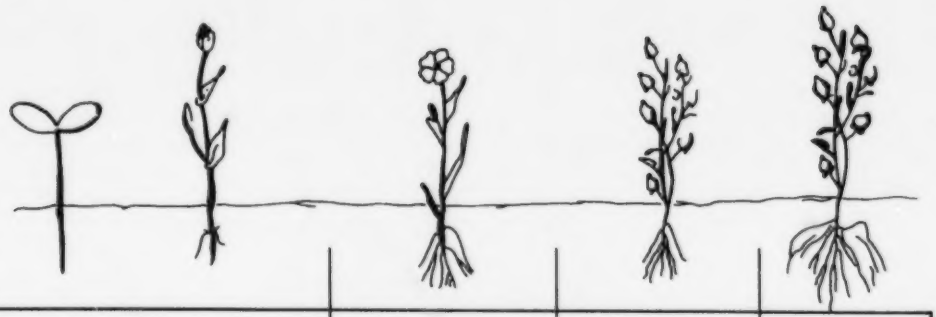


Figure 2.

Growth and development of flax



GROWTH PERIOD	EMERGENCE TO BUD	FLOWERING	SEED FORMATION	RIPENING
POST EMERGENCE DATES	30 - 35 DAYS	50 - 60 DAYS	70 - 85 DAYS	100 - 105 DAYS
CROP * ROOTING DEPTH	1.5 cm/DAY	2.0 cm/DAY	MINIMAL ROOT EXTENSION	
MOISTURE SENSITIVE PERIOD**				
AVERAGE DAILY E.T.	1.0 - 4.0mm/DAY	4.0 - 6.0mm/DAY	6.0 - 7.0mm/DAY	<7.0mm/DAY

* Maximum rooting depth will occur approximately by the time flowering begins.

** For optimum production, the first irrigation will be required before the crop enters into its water sensitive period.

The above times, depths and amounts are only average for this particular crop. These values will change depending on the variety and area where this crop is grown.

Soil

Soils can vary greatly in texture from being very fine (clay) to very coarse (sand) within a crop root zone. Because soil texture can change quite quickly, so can the amount of water that the soil is able to hold.

Texture	Available Moisture
Loamy sand	8-12 mm/0.1m (0.9-1.4 in./ft)
Sand loam	10-15 mm/0.1m (1.2-1.8 in./ft)
Loam	14-18 mm/0.1m (1.7-2.1 in./ft)
Sand clay loam, clay loam, clay	15-20 mm/0.1m (1.8-2.4 in./ft)
Silty clay loam, silt loam	16-22 mm/0.1m (1.9-2.6 in./ft)

It is important to know and to be able to calculate the amount of moisture present in the soil root zone in order to understand the amount of moisture available for crop use. The allowable depletion level is the amount of soil moisture that can safely be removed from the root zone by a crop before an irrigation is required. For flax, the allowable depletion level has been determined to be 50 per cent. The simplest way to determine soil moisture content is by the "feel" method. By feeling, squeezing and observing a handful of soil, one can determine the amount of moisture present in the soil. The following chart outlines the various characteristics of soil based on different contents of water.

		Feel or Appearance of Soils		
	PERCENT OF AVAILABLE MOISTURE REMAINING	MODERATELY COARSE TEXTURE	MEDIUM TEXTURE	MODERATELY FINE TEXTURE
DO NOT IRRIGATE	At field capacity 100	Upon squeezing no free water appears on soil but wet outline of ball is on left hand.	Same as sandy loam.	Same as sandy loam.
	75 to field capacity	Forms a weak ball, breaks easily, will not slide.	Forms a ball and is very pliable; slicks readily if relatively high in clay	Easily ribbons out between fingers, has a slick feeling
IRRIGATE SPEC. CROPS	50 to 75	Tends to ball under pressure but seldom will hold together	Forms a ball; somewhat plastic; will sometimes slick slightly with pressure.	Forms a ball, will ribbon out between thumb and forefinger
IRRIGATE	25 to 50	Still appears to be dry, will not form ball with pressure.*	Somewhat crumbly but will hold together from pressure.	Somewhat pliable, will ball under pressure
	0 to 25	Dry, loose, single-grained, flows through fingers.	Powdery, dry, sometimes slightly crusted but easily breaks down into powdery condition	Hard, baked, cracked; sometimes has loose crumbs on surface

* Ball is formed by squeezing a handful of soil firmly.